

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: ALPINE KNIT FABRICS LTD
Address of the Factory	: 168, (BJC) Godhnail, Narayananj-1400
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Structural Inspection	: 2015-07-06
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-07-06
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-07-06
BKMEA Membership No.	: 232

BASIC INFORMATION: The main factory building is a single storied non-engineered shed over roof truss supported by steel column. After the visual observation following general information are noted:

i. Building Usage Type	: Garment factory.
ii. Structural System	: Roof truss shed with steel column.
iii. Floor System	: Roof truss.
iv. Floor Area	: 42000 sft.
v. No. of Stories	: Single storey.
vi. Construction Year	: 1880.
vii. Foundation Type	: Unknown
viii. Design Drawings	: Available : Approval plan, as built machine layout plan(without dimension) Not available: Structural drawing
ix. Soil Investigation Report	: Not Available.
x. construction Materials	: Roof truss, steel columns
xi. Generator	: Ground floor.

RECOMMENDATIONS FOR CORRECTIVE ACTION: Corrective action for structure are,

Short Term (Immediate)	: N/A
Mid Term (6-weeks)	: 1. Building engineer to verify the integrity of existing roofing system on entire structure.
Long Term (6-months)	: 1. Install horizontal bracings if required. 2. Develop set of as-built drawings showing structure details, loading, dimensions, levels, foundations and framing on Plan, Section and Elevation drawings.

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The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety corrective actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<p>N/A</p>
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity)</i></p>	<ul style="list-style-type: none"> • Factory need to have proper testing plan & record of fire safety equipment. • Lights in storage area needed to be installed with protective covers and conduits. • Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct shall be minimum 2.9 m and when used as a storage facility there shall be a minimum clearance of one third the floor height from the ceiling to the top of the storage stack.
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> • Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension. • Fire license needs to be renewed by mentioning full coverage area. • Fire manager/Director need to have safety training from proper authority & worker of the factory should as far as possible be trained for use fire extinguisher. • All the exit doors need to be replaced by side swinging so that un-lockable doors can be opened easily in the direction of evacuation without the use of a key.
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> • Fire department pre-plan needs to be developed. • Increase an exit or keep open the existing locked exits so that maximum travel distance remains within 60 m. • The final exit-1 need to be protected from generator room by 4 hours rated construction with 2 hours rated doors/opening also need to have the protected escape route till to reach safe refuse area. • Boiler room need to be protected from finishing section by 4 hours

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	<p>rated construction with 2 hours rated doors/opening till to reach safe refuse area.</p> <ul style="list-style-type: none">• The final exit-1 need to be protected from generator room by 4 hours rated construction with 2 hours rated doors/opening also need to have the protected escape route till to reach safe refuse area.• Factory need to install centralized and automatic fire detection & alarm system on all occupied floors, including other tenanted floors of the building as per NTPA Guideline.• The factory need to install manually operated electrical fire alarm system and automatic fire alarm system with single or multiple call boxes on all occupied floors, including other tenanted floors of the building.• Factory needs to install control panel for centralized automatic smoke detection & fire alarm system according to NTPA Guideline.• Factory needs to install proper standpipe system with having at least 75 mm dia of riser.• Install 1 riser per 1000 m² of floor area & Install adequate number of hose in floor area and the minimum hose diameter is 38 mm, or 1.5" preferably fabric hose with variable nozzle to be used in both of the stairways covering the floor area.• Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 Kpa. For standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 Kpa.• Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection.• Factory needs to have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory.• Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least $1900 \times 75 = 142500$ liters water storage tank.
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(B): Recommendations for Electrical Safety corrective actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<p>N/A</p>
<p>Short Term <i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity)</i></p>	<ul style="list-style-type: none"> • Ensure all distribution boards (including panel door) are earthed properly. • Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit. • Ensure proper earthing connections at all electrical equipment (Water pump). • Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering. • Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> • Provide two separate and distinct connections of earthing for generator. • Provide dedicated & adequate size of earthing with proper identification for each circuit from the earth busbar of distribution boards and ensure continuous earth path is back to main building intake. • Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Provide mechanical guards for electrical equipment where necessary. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Connect all metal in the sheds to the earthing system.

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	<ul style="list-style-type: none"> • Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple cables at single point,) of overheating { ambient+(200C-400C)} and take proper action.
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> • Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system. • Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data. • Inspect electrical panel boards on an annual basis. • Ensure the generator room has adequate fire separation from the production area. • Ensure distribution boards have no opening and all live internal components are concealed properly. • Provide dedicated & adequate size of neutral with proper identification for each circuit. • Ensure each distribution board is provided with a circuit list and means of identification is provided as per list. • Provide proper cable terminator/connector for stranded conductors at its point of termination. • Install separate distribution boards for lighting and power circuits. • Install lightning protection system on the building.